HK 13: Instrumentation V

Zeit: Montag 16:30–18:30 Raum: HZO 80

Gruppenbericht HK 13.1 Mo 16:30 HZO 80

Data preprocessing of the DAQ system for TOF detector in CBM experiment — •Wenxiong Zhou[1,2], Pierre Ioizeau[1], Jochen Fruehauf[1], Junfeng Yang[1], David Emschermann[1], and Walter Muller[1] for the CBM-Collaboration — [1]GSI Helmholtz Center for Heavy Ion Research, Darmstadt, Germany — [2]Chongqing University, Chongqing, China

In order to acquire the larger volume of data in the Compressed Baryonic Matter (CBM) experiment, a new free-trigger data acquisition (TLDAQ) system will be used. TOF detector is one of the detectors will be used in the CBM experiment. To ensure the correct data transfer and easy data reconstruction in the TOF DAQ system, the data should be processed before it is sent to back-end computer cluster. Therefore, a data preprocessing board is needed. In additional to the time data of the TOF detector, there is also epoch data from every front end electronics (FEE). The epoch data is very important for the TLDAQ system, it is the foundation of the event reconstruction in back-end computer. To reduce data volume and simplify the event reconstruction, the same epoch events from different FEEs should be merged into one event. A data preprocessing method is proposed to solve this problem. The process is divided into two parts. The first part is used to separate epoch event from data event. Every input FEE has a such module. The second part is used to merge data and epoch from different FEEs into one frame. This architecture can avoid the decreasing of data transfer speed when there are many input FEEs.

HK 13.2 Mo 17:00 HZO 80

Hit reconstruction for the CBM-TRD — •Philipp Munkes for the CBM-Collaboration — Institut für Kernphysik, WWU Münster, Germany

The Compressed Baryonic Matter (CBM) experiment is a fixed target heavy-ion experiment at the SIS100 accelerator at FAIR. The CBM Transition Radiation Detector (TRD) is one of the key detectors to provide electron as well as charged fragment identification and tracking. The experiment is planned to be run with data taking in a free-streaming configuration with a software trigger. After the software trigger performs a fast evaluation of a timeslice, a self-contained portion of the data stream from the experiment, all data matching the trigger conditions is analyzed online and written to disk after the full reconstruction. Corresponding algorithms are currently being developed and tested in Frankfurt and Münster and tested on data recorded during various test beam campaigns of the CBM-TRD. This talk will present the current status of the CBM-TRD offline analysis framework and an evaluation of the various reconstruction algorithms employed therein. This work is supported by BMBF.

HK 13.3 Mo 17:15 HZO 80

The Endcap Disc DIRC for PANDA at FAIR — •Mustafa Schmidt, Simon Bodenschatz, Michael Düren, Erik Etzelmüller, Klaus Föhl, Avetik Hayrapetyan, Kristof Kreutzfeldt, Julian Rieke, and Marc Strickert — II. Physikalisches Institut, JLU Gießen, Deutschland

The Endcap Disc DIRC is a Cherenkov detector that has been developed to provide an excellent particle identification for the future PANDA experiment by separating $\pi^{\pm}$ and $K^{\pm}$ up to a momentum of 4 GeV/c with a separation power of 3σ in the polar angle region from 5° to 22°. This goal will be achieved by using a highly polished Cherenkov radiator made of synthetic fused silica that is read out at the rim by using focusing elements and fast photo sensors. Different MCP-PMT photocathode materials and setup options have been studied with the help of Monte-Carlo simulations and validated by testing several prototype detectors in particle beams at CERN and DESY. This talk covers mainly the dedicated reconstruction algorithms that are used for obtaining likelihood values for different particle hypotheses. A full simulation of one detector quadrant has been performed to study the detector performance for different particle momenta under the influence of the magnetic field of the PANDA solenoid magnet. Furthermore, the glueball decay $\bar{p}p \to f_0(1500)\pi^0 \to K^+K^-\pi^0$ was chosen as a benchmark channel to evaluate PID ith the Endcap Disc DIRC in PANDA. For a fast event-filtering, an online reconstruction framework has been prepared. Preliminary tests, which have been carried out with a Virtex-4 FPGA card, show promising results.

HK 13.4 Mo 17:30 HZO 80

Track reconstruction within the Cellular Automaton approach for the PANDA Forward Tracking System — •Pugach Mykhailo[1,2,3], Ivan Kisel[1,2], Maksym Zyzak[4], and Irina Zivko[5] — [1]Goethe-Universität, Frankfurt — [2]Frankfurt Institute for Advanced Studies, Frankfurt — [3]KINR, Kyiv, Ukraine — [4]GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt — [5]ITEP, Moscow, Russia

Aiming to reconstruct particles emitted at small angles and flying through a non-uniform magnetic field in the Forward Tracking System (FTS) of the PANDA experiment, a software package has been developed within the Cellular Automaton approach taking advantages of modern processor architectures by using the Vector Classes libraries for parallel data processing as well as providing a user-friendly experience through interfaces which enable the usage of any of the algorithm's functionality from the PandaRoot framework.
The implemented algorithm intends to group hits into tracks estimating the momentum as well as other kinematical propeties of the track (coordinates and slopes to the coordinate axes).
In this talk the developed algorithm is described extensively taking into account the specifics of the FTS, quality assurance plots are presented as well verifying high efficiency rates.
Supported by HIC for FAIR and HGS-HIRe.

HK 13.5 Mo 17:45 HZO 80

Fuzzy Bayes Tracking – Experimental performance — •Philipp Napiralla[1], Herbert Egger[2], Philipp R. John[1], Norbert Pietralla[1], Michael Reese[1], and Christian Stahl[1] — [1]Institut für Kernphysik, TU Darmstadt — [2]AG Numerik und wissenschaftliches Rechnen, TU Darmstadt

The Advanced GAmma Tracking Array (AGATA) is a new type of γ-spectrometer using position resolution via Pulse Shape Analysis to allow for a high energy resolution in addition to high efficiency. Due to its Germanium shell without any Compton shielding, γ-ray tracking algorithms are needed. In contrast to existing tracking algorithms that are based on a "Figure of Merit" approach, the so-called *Bayes-Tracking algorithm* uses conditional probability densities and Bayes' Theorem. As an improvement of the *Bayes-Tracking algorithm*, the presented *Fuzzy Bayes Tracking* (FBT) introduces fuzzy logic and machine learning into the framework. FBT's performance on experimental source data is shown and compared to existing tracking algorithms. An outlook on possible experimental applications of the Fuzzy Bayes Tracking is given.

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HK 13.6 Mo 18:00 HZO 80

XRootD-Plugin-basierte Lösungen für Site-spezifische Anforderungen — •Jan Knedlik, Paul Kramp und Schwarz Kilian — GSI Helmholtzzentrum für Schwerionenforschung, Planckstr. 1, 62491 Darmstadt

XRootD hat sich als ein Standard für WAN-Zugriff auf Daten in HEP und HENP etabliert. Dabei sind Site-spezifische Anforderungen wie sie bei GSI existieren, bisher technisch schwierig umzusetzen gewesen. XRootD erlaubt die Anpassung von grundlegenden Funktionen der XRootD Server durch Plugins, seit Version 4.0 auch für die Anpassung der XRootD Clients. In diesem Beitrag zeigen wir unsere XRootD-basierten Entwicklungen am Beispiel des ALICE Tier 2 Zentrums und der zukünftigen ALICE Analysis Facility. Unter anderem wird ein XRootD-Redirector-Plugin vorgestellt, welches lokale Clients direkt auf ein lokal gemountetes Shared-Filesystem weiterleitet, sowie die dafür notwendigen Änderungen an XRootD, welche ab Version 4.8.0 verfügbar sind. Zudem wurde einen Prototyp für einen XRootD-Shared-Filesystem-Caching-Proxy erstellt.

HK 13.7 Mo 18:15 HZO 80

Ongoing development of the ALICE Tier 2 Center at GSI — •Sören Fleischer, Raffaele Grosso, Jan Knedlik, Thorsten Kollegger, Paul Kramp, and Kilian Schwarz for the ALICE-Collaboration — GSI, Planckstr. 1, 64291 Darmstadt

GSI has been operating a Tier 2 Center for the ALICE experiment since 2004. It runs on the shared computing cluster in the Green IT

Cube at GSI. In 2017 it has been the largest and one of the most efficient ALICE Tier 2 Centers. In this contribution we describe the current status of the center and important changes within the past year. Those include the development of an XRootD plugin which allows local grid clients direct access to a shared file system avoiding XRootD data servers, as well as a plugin that creates symbolic links in order to simplify local data access without grid methods. Medium-term the ALICE Tier 2 Center at GSI will be transformed into one of presumably 3 ALICE Analysis Facilties. The anticipated changes thereby arising are presented.